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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/677,629	10/03/2000	Yuichi Nakao	68596	7023

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MCGLEW & TUTTLE, PC
1 SCARBOROUGH STATION PLAZA
SCARBOROUGH, NY 10510-0827

EXAMINER	
MARTIR, LILYBETT	
ART UNIT	PAPER NUMBER
2855	

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/677,629	Applicant(s) NAKAO ET AL.	
	Examiner Lilybett Martir	Art Unit 2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *20* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cage et al. (Pat. 4,876,898) in view of Lew et al. (Pat. 5,663,509) and further in view of Keita et al. (Pat. 5,796,011).

- With respect to claim 1, Cage et al. teaches two flow tubes as in elements 11 and 11' having joint ends, an entry side manifold as in element 12 that is connected to one set of said joint ends of said two flow tubes and branches a fluid being measured from an inlet port into said two flow tubes (Col.6, lines 26-28), and exit side manifold as in element 12' connected to another set of said joint ends of said two flow tubes into an outlet port to discharge said fluid being measured (Col. 6, lines 28-30), a drive unit as in element 16 for driving and resonating one of said flow tubes with another of said flow tubes at mutually opposite phases, and a pair of oscillation sensors as in elements 17 and 18 installed at locations horizontally symmetrical with respect to an installation location of said drive unit for sensing a phase difference proportional a coriolis force; said two flow tubes as in elements 11 and 11' being connected to the entry side manifold as in element 12 and the exit side manifold as in element 12' at the

joint ends as noted in Figure 1; and said entry side and exit side manifolds being connected to said flow tube at said joint ends at a predetermined rise angle in a same direction as said flow tubes (Col. 13, lines 38-42). Cage et al. fails to disclose the utilization of manifolds that comprise curved branches where said curved branches are smoothly bent, and parallel tubes being curved into an arch shape. Lew et al. teaches a flow measuring device having two parallel conduits as in elements 44 and 45 joined to manifolds 47 and 47 where there joint ends are not positioned in a parallel manner, but instead they are positioned in an angularly spaced manner, said conduits having a curvature that is continuous as noted in Figure 5, and as noted in said figure, he teaches entry and exit side manifolds (pipe portion with several lateral outlets for connecting one piece with others) as are the intermediate portions formed between 46-47 and 44-45 which each comprise first and second branches (note how one conduit becomes two conduits) that bend to terminate at an acute angle relative to an axial direction of an inlet 46 or outlet 47 portion. Keita et al. disclose a similar arrangement of the elements that comprise two measuring tubes 13 and 14 as shown in Figures 2a, 3, 5 and 7A and 7B that have a similar shape as the tubes 1 and 2 in applicants Figures 1,2 and 7. Keita et al. also discloses the use of a driver as in element 17 and sensors as in elements 18 and 19. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. using the teachings of the flow meter Lew et al. or Keita et al. by providing said coriolis flow meter with two conduits that have a

substantially ached shape with joint ends that are angularly spaced and not parallel for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made, since Cage et al. himself suggests in Col. 13, lines 30-33 that a plurality of shapes of flow conduits could be utilized on his invention as long as they oscillate in a resonant manner and Keita et al. discloses a similar shape, for the purpose of making said metering device versatile and reliable. It would also have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Keita et al. using the teachings of the flow meters of Lew et al. by providing said coriolis flow meter with entry and exit side manifolds which each comprise first and second branches for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made in an accurate and efficient manner by also helping to reduce turbulence.

- With respect to claim 2, Cage et al. teaches a sealed pressure-resistant case of a cylindrical shape in axis direction as in element 14 with openings of the cylindrical portion thereof closed by end plates, wherein said entry side and said exit side manifolds as in elements 12 and 12' are installed at corners of said cylindrical portion and passed through said corners as noted in figures 1 and 5.

- With respect to claim 3, Cage et al. teaches a pressure resistant case as in element 14 arranged around said two flow tubes 11 and 11' as noted in Figures

1, 2 and 5; said entry side and exit side manifolds as in elements 12 and 12' having a pair of integrally formed disc-shaped flanges as noted in Figure 1 to which both ends of said case are fixedly fitted; the cross-sectional shape of said pressure resistant case being an oval shape with the major axis oriented in the curved direction of said flow tubes (Col. 12, lines 33-37), with the length of said major axis smoothly and gradually reduced from the axial central part thereof to both ends thereof into a substantially circular shape over a predetermined length near both ends as noted in Figure 1.

-With respect to claim 5, Cage et al. teaches two flow tubes as in elements 11 and 11', an entry side manifold as in element 12 with an inlet port and two outlet ports, said two outlet ports being connected to said first joint ends of said two flow tubes and dividing an entry passage from said inlet port into said two flow tubes (Col. 6, lines 26-28), said entry passage having a smooth curve from said inlet port to said outlet port as suggested in Col. 13, lines 38-41; an exit side manifold as in element 12' with an outlet port and two inlet ports, said inlet ports being connected to said second joint ends of said two flow tubes and joining exit passages from said inlet port to said outlet port (Col. 6, lines 28-30), each of said exit passages having a smooth curve from respective said inlet ports to said outlet port as suggested in Col. 13, lines 38-41; a drive unit as in element 16 for driving and resonating one of said flow tubes with respect to another of said flow tubes at mutually opposite phases; a pair of oscillation sensors as in elements 17 and 18 installed at locations symmetrical with respect to said drive unit as noted

in Figure 1 for sensing a phase difference proportional to a coriolis force on fluid in said two flow tubes. Cage et al. fails to disclose the utilization of manifolds that comprise curved branches where said curved branches are smoothly bent or curved with an axial direction of the outlet ports being formed at an acute angle relative to an axial direction of the inlet port, and parallel tubes being curved into an arch shape. Lew et al. teaches a flow measuring device having two parallel conduits as in elements 44 and 45 joined to manifolds 47 and 47 where there joint ends are not positioned in a parallel manner, but instead they are positioned in an angularly spaced manner that is substantially formed at an acute angle, said conduits having a curvature that is continuous as noted in Figure 5, and as noted in said figure, he teaches entry and exit side manifolds (pipe portion with several lateral outlets for connecting one piece with others) as are the intermediate portions formed between 46-47 and 44-45 which each comprise first and second branches (note how one conduit becomes two conduits) that bend to terminate at an acute angle relative to an axial direction of an inlet 46 or outlet 47 portion. Keita et al. disclose a similar arrangement of the elements that comprise two measuring tubes 13 and 14 or 43 and 44 (see portions 45 and 46) as shown in Figures 2a, 3, 5 and 7 that have a similar shape as the tubes 1 and 2 in applicants Figures 1,7A and 7B. Keita et al. also discloses the use of a driver as in element 17 and sensors as in elements 18 and 19. 7. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. using the teachings of the

flow meters of either Lew et al. or Keita et al. by providing said coriolis flow meter with two conduits that have a substantially ached shape with joint ends that are angularly spaced and not parallel for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made, since Cage et al. himself suggests in Col. 13, lines 30-33 that a plurality of shapes of flow conduits could be utilized on his invention as long as they oscillate in a resonant manner and Keita et al. discloses a similar shape, for the purpose of making said metering device versatile and reliable. It would also have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Keita et al. using the teachings of the flow meters of Lew et al. by providing said coriolis flow meter with entry and exit side manifolds which each comprise first and second branches for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made in an accurate and efficient manner by also helping to reduce turbulence.

- With respect to claim 6, Cage et al. fails to teach an axial direction of said first joint ends being non-parallel with said axial directions of said second joint ends. Lew et al. teaches a flow measuring device having two parallel conduits as in elements 44 and 45 joined to manifolds 47 and 47 where there joint ends are not positioned in a parallel manner, but instead they are positioned in an angularly

spaced manner, said conduits having a curvature that is continuous as noted in Figure 5. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. using the teachings of the flow meters of either Lew et al. or Keita et al. by providing said coriolis flow meter with two conduits that have joint ends that are angularly spaced and not parallel for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made, since Cage et al. himself suggests in Col. 13, lines 30-33 that a plurality of shapes of flow conduits could be utilized on his invention as long as they oscillate in a resonant manner.

- With respect to claim 7, Cage et al. fails to teach an axial direction of said first joint ends being angularly spaced from said axial directions of said second joint ends. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. using the teachings of the flow meters of either Lew et al. or Keita et al. by providing said coriolis flow meter with two conduits that have a substantially ached shape with joint ends that are angularly spaced and not parallel for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made, since Cage et al. himself suggests in Col. 13,

lines 30-33 that a plurality of shapes of flow conduits could be utilized on his invention as long as they oscillate in a resonant manner.

- With respect to claim 8, Cage et al. teaches a sealed pressure case as in element 14 surrounding said two flow tubes as in elements 11 and 11', said pressure case having a cylindrical shape with ends of said cylindrical shape closed by end plates and forming corners with said cylindrical shape as noted in Figures 1 and 5, said entry and exit manifolds being arranged in said corners of said case.

- With respect to claim 9, Cage et al. teaches end plates being flanges of said entry and exit manifolds 12 and 12'; a radial cross section of said pressure case having an oval shape with a major axis of said oval shape being oriented in a curved direction of said flow tubes as noted in Figure 5, a length of said major axis being a maximum at a central portion of said pressure case and diminishing toward said ends of said cylindrical shape to have said cross section pressure case change to a substantially circular shape at said ends of said cylindrical shape as noted in Figures 1,2 and 5.

- With respect to claims 4 and 10, Cage et al teaches a temperature sensor 72 arranged on one said flow tubes and said manifolds, said temperature sensor measuring temperatures affecting the rigidity of said flow tubes (Col. 11, lines 8-12). Keita et al. also teaches the utilization of a temperature sensor 54 in his arrangement. Cage et al fails to teach the utilization of a second temperature sensor for compensating the thermal effects of a distance between the fixed ends

on both sides of said flow tubes. Since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art; St. Regis Paper Co. v. Bemis Co., 193 USPQ 8; it would also have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. by providing it with a second temperature sensor for the purpose of providing the means necessary to keep track of ambient conditions such as the temperature since it is well known in the art that temperature affects the elasticity of the components of a Coriolis flow meter, therefore making said flow measurements more accurate by having two sensors producing more measurements.

- With respect to claim 11, Cage et al. fails to teach each curve being continuous from said first joint end to said second joint end. Lew et al. teaches a flow measuring device having two parallel conduits as in elements 44 and 45 joined to manifolds 47 and 47 where there joint ends are not positioned in a parallel manner, but instead they are positioned in an angularly spaced manner, said conduits having a curvature that is continuous as noted in Figure 5. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Cage et al. using the teachings of the flow meters of either Lew et al. or Keita et al. by providing said coriolis flow meter with two conduits that have a substantially ached shape with conduits that have a curvature that is continuous for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be

resonantly oscillated about an axis that will allow flow measurements to be made, since Cage et al. himself suggests in Col. 13, lines 30-33 that a plurality of shapes of flow conduits could be utilized on his invention as long as they oscillate in a resonant manner.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keita et al. (Pat. 5,796,011) in view of Lew et al. (Pat. 5,663,509).

- With respect to claim 12, Keita et al teaches first and second arched flow tubes as in elements 43 and 44 having a curve in one direction and each lying in a particular plane, said planes being parallel, and each tube being connected to an inlet and an outlet branch end (See Figures 7-9), a drive unit as in element 57 (Col. 6, lines 21-23), a pair of oscillator sensors as in elements 58 and 59 (Col. 6,lines 31-42). Keita et al. fails to clearly depict the arrangement of his manifold portion, so that he provides entry and exit side manifolds which each comprise first and second branches that bend to terminate at an acute angle relative to an axial direction of an inlet or outlet portion. Lew et al. teaches as depicted in his Figure 5 entry and exit side manifolds (pipe portion with several lateral outlets for connecting one piece with others) as are the intermediate portions formed between 46-47 and 44-45 which each comprise first and second branches (note how one conduit becomes two conduits) that bend to terminate at an acute angle relative to an axial direction of an inlet 46 or outlet 47 portion. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the coriolis flow meter of Keita et al. using the teachings of the

flow meters of Lew et al. by providing said coriolis flow meter with entry and exit side manifolds which each comprise first and second branches that bend to terminate at an acute angle relative to an axial direction of an inlet or outlet portion for the purpose of modifying the shape of said known components in order to provide multiple conduits that can be resonantly oscillated about an axis that will allow flow measurements to be made in an accurate and efficient manner by also reducing turbulence.

Response to Arguments

4. Applicant's arguments, with respect to the rejection(s)of claim(s) 1-12 under Cage et al., Lew et al. and Keita et al. have been fully considered and are persuasive. Therefore, the final rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Cage et al., Lew et al. and Keita et al., in which applicant's arguments have been fully addressed, and some points of the rejection which where addressed by the applicant in said arguments have been further clarified.

5. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to

combine the art is found in the knowledge generally available to one of ordinary skill in the art, and the references cited are all from analogous art.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lilybett Martir whose telephone number is (703)305-6900. The examiner can normally be reached on 9:00 AM to 5:30 PM.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

8. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

CM

Lilybett Martir
Examiner
Art Unit 2855

LCM

EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800